In Touch

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KEEPING OUR DRINKING WATER SAFE

The Importance of Maintaining our Water Distribution System

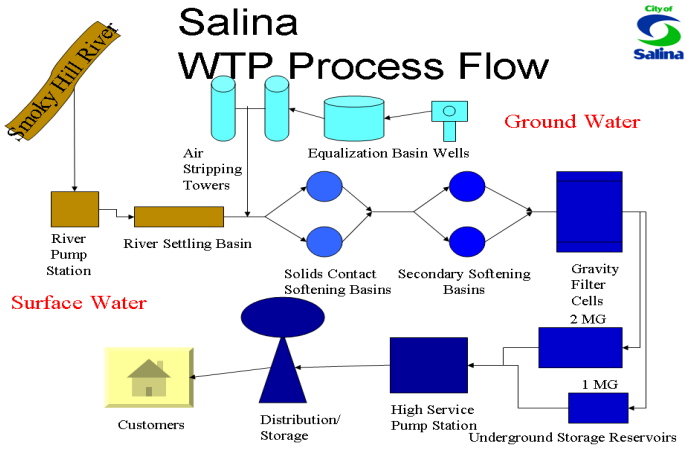
The City's public water system is regulated by the United States Safe Drinking Water Act (SDWA), which is the main federal law that ensures the quality of America's drinking water. Under the SDWA, the Environmental Protection Agency (EPA) sets standards for drinking water quality and oversees the states and water suppliers who implement those standards. The SDWA was originally passed by Congress in 1974 to protect public health by regulating the nation's public drinking water supply. The law was amended in 1986 and 1996, and requires many actions to protect drinking water and its sources. There are more than 170,000 public water systems providing water from wells, rivers and other sources to about 250 million Americans.

These millions of Americans receive high quality drinking water every day from their public water systems. Nonetheless, drinking water safety cannot be taken for granted. There are a number of threats to drinking water: improperly disposed of chemicals; animal wastes; pesticides; human wastes; wastes injected deep underground; and naturally-occurring substances can all contaminate drinking water. Likewise, drinking water that is not properly treated or disinfected, or which travels through an improperly maintained distribution system, may also pose a health risk.

Our city's water distribution system consists of over 323 miles of water mains ranging in size from 2-inch to 30-inch diameter pipes. There are approximately 2,365 fire hydrants spaced approximately 500-feet apart to protect homes and businesses in case of fires. There are approximately 4,230 water valves that are utilized to isolate and shut down a water main if a pipe breaks in the water distribution system.

The water is treated at the Water Treatment Plant, located at 401 South 5th Street. High pressure pumps push treated water into the distribution system. Due to the fluctuating usage of potable water, 8 above ground water towers, with a total storage capacity of over 4 million gallons, are used to store much of the water until there is an increase in demand. In addition, the City has five booster pump stations to transfer water from the base pressure zone to 4 separate higher pressure zones.

Demand for water in our city varies greatly from winter to summer. In the winter, the average daily demand is approximately 5 million gallons per day or about 104 gallons per person. In the summer, lawn irrigation increases the daily usage to almost 9 million gallons per day or about 187 gallons per person.



To maintain EPA's standards for drinking water quality in the City's water distribution system and in Saline County's Rural Water District #3, the Utilities Department does important preventative maintenance activities.

Annual Flushing of Fire Hydrants maintains high quality water in the system.

The flushing achieves the following three objectives:

1) Helps keep the interior of the water lines clean by removing sediment
2) Helps maintain good quality water in the water distribution system
3) Provides an opportunity to check the operation of all fire hydrants

Flushing fire hydrants is a method of cleaning the water mains through a network of flushing sequences with the dirty water being discharged at fire hydrants. Maintaining the flushing sequence is important so that the water used in the flushing sequence remains clean. The higher water flow velocities in the water main allows for scouring of the interior of the water mains. The flushing of the water mains dislodges and removes mineral deposits, sediment and biological deposits that accumulate in the water mains.

Flushing one fire hydrant typically takes about 7 minutes, and discharges approximately 700 gallons per minute or a total of 4,900 gallons, which is similar to what one average household uses in a month. A majority of the water flows along the street's curb and gutter and into the City's storm drainage collection system and eventually into streams and rivers.

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An informed citizen

City of Salina

Is a better citizen!

During the fire hydrant flushing time period, a temporary variation in tap water color, as well as small amounts of sediment may occur. Running water at the tap for one or two minutes should help clear this temporary occurrence. Avoid doing laundry if the water is discolored.

Public water suppliers are required to keep minimum chlorine residuals throughout the water distribution system. If chlorine residuals are low, it can result in biofilms in the water system. Biofilms are micro-organisms that grow on the inside surface of the water mains and storage tanks. Biofilms are non-toxic and do not show up in required bacterial testing. Biofilms grow first in low flow lines, at line obstructions, in dead-end lines, and storage tanks. Regular flushing of the water mains through fire hydrants is used to improve chlorine residuals and water quality.

Annual Free Chlorine Flushing of the Water Distribution System is performed during the summer to eliminate/control the biofilm problem. This procedure requires a change in the normal treatment procedure at the Water Treatment Plant by changing from a combined chlorine residual in the water distribution system to a free chlorine residual. Free chlorine is a much stronger disinfectant, and will kill off the biofilm. The free chlorine flushing procedure lasts for about one month and is completed in conjunction with the annual fire hydrant flushing program.

Customers may notice a strong chlorine taste or chlorine odor in their tap water during this time period. This temporary condition is normal during the modified disinfection process and will not cause adverse health effects. To dissipate some of the chlorine taste and odor, you may put an open container of drinking water in your refrigerator for a few hours.

Water Main Replacements are eventually necessary when preventative maintenance activities no longer correct the problems. Due to these costly capital expenditures, careful planning must be detailed. The City's Capital Improvement Program (CIP) is a blueprint for planning and effectively managing capital expenditures.

The most urgent needs for the City to address are taste and odor problems, and lack of fire flow capacity caused by the aging cast iron piping network. Old, unlined cast iron water mains often develop tuberculation that gradually constricts flow and causes water flow discoloration due to corrosion products. The results of tuberculation are low fire flows and the presence of iron bacteria, which causes taste and odor complaints. Fire hydrant flushing and other cleaning methods can be performed to reduce tuberculation; however, regrowth of the incrustations is very rapid and flushing and cleaning are not permanent solutions. Tuberculation has been found to be most problematic in the water mains that are 6-inch and smaller, over 50 years in age and where velocities in the water mains are low.

A computer model was developed by Professional Engineering Consultants P.A. (PEC) of Wichita, Kansas. The model simulates the water distribution system piping network and indicates age of water, velocities in water mains, fire flow capacities, and pressure.

The original distribution system was constructed in the early 1900's, and the majority of that construction took place in the early 1900's through the 1960's. The water main material was cast iron, which was cast in sand molds. These old sand cast iron water mains were not uniform in size and were not cement lined, which resulted in a rough interior of the water mains, which provides a surface for the iron bacteria to attach to. The water system consists of 228 miles of cast iron water main, or 71% of the total length of water mains. Approximately 203 miles of the water system are 6-inch or smaller diameter cast iron water mains.

A Water Distribution System CIP was created with input from administrative, treatment, distribution and fire personnel, along with PEC. The CIP establishes a specific list of projects for the years of 2010 and 2011, and include a detailed list of projects extending through 2030. Approximately $4 million a year for the next five years is scheduled for cast iron water main replacement and fire flow improvements. Refer to the following list of water main replacements for the years of 2010 and 2011.

If you would like additional information about the City's water distribution system, annual maintenance procedures, or water main replacement projects proposed in the CIP, please contact Martha Tasker, Director of Utilities at (785)309-5725.

Cast iron pipe with tuberculation

2010 Water Main Replacements

September 2010 - August 2011

Water Main Replacement Location	Length/Feet		Est. Project Cost	Line Size	Year Const.
Aullwood (Brookwood to Glen)	1322	LF	$132,200.00	6	1960
Antrim (10th to 11th)	363	LF	$36,300.00	2	1928,37,or46
Aspen Road (Starlight to Crawford)	1050	LF	$105,000.00	6	1960
Armory - south of South Street to west of Broadway	800	LF	$92,000.00	12	New
Melrose Lane (Knollcrest to Fairdale Road)	1246	LF	$124,600.00	6	1958
Iron,Front,Johnstown (4th to Penn)	2618	LF	$301,070.00	6 & 8	1928
Roberts (Talley to Cloud)	1660	LF	$166,000.00	6	1959
Harold (Talley to Haskett)	1990	LF	$199,000.00	6	1960
Talley (Roberts to Haskett)	1327	LF	$132,700.00	6	1960
Highland (Cloud to Wayne)	2670	LF	$267,000.00	6	1951,52,53
Page (Harold to Talley)	1296	LF	$129,600.00	6	1960
Lena (Haskett to Hageman)	1555	LF	$155,500.00	6	1960
Haskett (Otto to Talley)	1419	LF	$141,900.00	6	1960
Hartland (Robin to Belmont)	645	LF	$64,500.00	6	1962
Nottingham (Belmont to Ohio)	1300	LF	$130,000.00	6	1960
Quincy & Mayfair Dr. (Kensington to Belmont)	1315	LF	$131,500.00	6	1960
Riverside (Elm to Penn)	1234	LF	$123,400.00	4	1915
Highland (Key to 370 feet south of Belmont)	1102	LF	$110,200.00	6	1962
Key (Market Place to Belmont)	1570	LF	$157,000.00	6	1962
Moreland Ave. (Highland to Key)	826	LF	$82,600.00	6	1962
Yale (Page to Lena)	920	LF	$92,000.00	6	1960
Marvin Ave. (Harold to Hageman)	884	LF	$88,400.00	6	1960
Otto Ave. (Haskett to 160 feet west of Meadowlark)	500	LF	$50,000.00	6	1960
Haskett Ave. (Otto to Meadowlark Lane)	408	LF	$40,800.00	6	1960
Jupitor (Neptune to Hageman)	903	LF	$90,300.00	6	1963
Wilson (Front St. to 105 feet west of Third St.)	772	LF	$77,200.00	2	1950
Second St. (Wilson to 284 feet south)	284	LF	$28,400.00	2	1950 ???
Jewell (Fourth to Quincy)	1203	LF	$138,345.00	4	1938 & 1949
Ellsworth (Fourth to 338 feet east of Osborne)	960	LF	$96,000.00	4	1938 & 1947
Third St. (Mulberry to 414 feet north of Walnut)	1236	LF	$123,600.00	4	1923
Royal Dr. (Flint to Kingston) & Kingston (Royal Dr. east to Cul-de-Sac)	878	LF	$87,800.00	6	1958
Royal Dr. (Glenshire to Fairway) & Fairway St. west to Cul-de-Sac)	594	LF	$59,400.00	6	1958
North St. (Marymount to Eastborough) & Eastborough(North St. to 628 ft south	3220	LF	$370,300.00	12	New
TOTAL	40070	LF	$4,124,615.00		

2011 Water Main Replacements

September 2011 - August 2012					
Water Main Replacement Location	Length/Feet		Est. Project Cost	Line Size	Year Const.
Andrew (Harold to Page)	912	LF	$91,200.00	6	1960
Yale (Harold to Page)	695	LF	$69,500.00	6	1960
Kenny (Talley to Andrew)	400	LF	$40,000.00	6	1960
Ingman (Talley to Page)	1073	LF	$107,300.00	6	1957 & 1960
Carlton (Ingman to Page)	443	LF	$44,300.00	6	1958
Page (Roberts to Talley)	1320	LF	$132,000.00	6	1957,58 & 60
Harold (Haskett to Yale)	818	LF	$81,800.00	6	1960
Yale (Lena to Harold)	292	LF	$29,200.00	6	1960
Belmont (Highland to Hartland)	1704	LF	$170,400.00	8	1962
Summer Lane (Belmont south into cul-de-sac)	395	LF	$39,500.00	6	1962
Lewis (Belmont to Ohio)	924	LF	$92,400.00	6	1960
11th St. (South to Walnut)	1354	LF	$135,400.00	4	1928
Edgehill (Knollcrest to Fairdale)	1225	LF	$122,500.00	6	1958
Riverside (Elm to Penn)	2060	LF	$206,000.00	4 & 6	1915
Highland (Magnolia to Key)	1530	LF	$153,000.00	6	1961 & 1962
Ray (Highland to Belmont)	1248	LF	$124,800.00	6	1962
Royal Dr. (Fairway to Derby) & Derby, east into cul-de-sac	860	LF	$86,000.00	6	1958
Schilling Road (Marcella to Royal Drive)	1292	LF	$148,580.00	12	New
Centennial Road (Tony's Road to 750 feet south of Schilling Rd.)	8850	LF	$885,000.00	10	1955
Wilson St. (Santa Fe to Fifth St.)	452	LF	$45,200.00	4	1922
Kansas State Tech. School (Centennial to 794 west)	794	LF	$91,310.00	12	New
Royal Dr. (Derby to Hartford) & Hartford (west to cul-de-sac)	635	LF	$63,500.00	6	1958
Oakdale,(200 ft. north of Park Place to Iron) & Iron (Oakdale to Penn)	1261	LF	$126,100.00	4 & 6	1914 & 1928
Oakdale Dr. (Walnut to 470 feet south of Park Place)	705	LF	$70,500.00	4	1916 &1928
Kensington St. (Quincy to Belmont)	1090	LF	$109,000.00	6	1960
Roach (Belmont to Ohio St.)	1566	LF	$156,600.00	6	1960
10th (Inez to Antrim)	600	LF	$60,000.00	6	1928
Inez (9th to 130 feet west of 10th St.)	425	LF	$42,500.00	6	1927
4th Street (Otis to Euclid)	700	LF	$70,000.00	6	1947
Approximately 700 feet north of Arnold Ct. (at General Jim St.)	490	LF	$56,350.00	12	New
Simmons (Leslie to Cloud)	1500	LF	$150,000.00	6	1951 & 1952
Belmont (Hartland to Parkway) & Parkway (Belmont to Robin Road)	790	LF	$79,000.00	6 & 8	1961 & 1962
Osborne (Cloud to Claflin) & Russell (Osborne to dead end)	876	LF	$87,600.00	2 & 4	1947 & 1948
Rockhurt (Key to Ray St.)	275	LF	$27,500.00	6	1962
Harold (Yale to Yale)	230	LF	$23,000.00	6	1960
TOTAL	39784	LF	$4,017,040.00		